Massachusetts Electric
A **National Grid** Company

March 1, 2005

Mary L. Cottrell, Secretary
Department of Telecommunications and Energy
One South Station
Boston, MA 02110

Re: D.T.E. 04-116

Dear Secretary Cottrell:

On behalf of Massachusetts Electric Company and Nantucket Electric Company we are submitting comments in the above-captioned docket. Thank you very much for the opportunity to submit these comments.

Very truly yours,

Amy G. Rabinowitz
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cc: Joseph W. Rogers, Office of the Attorney General

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COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

Investigation by the Department of Telecommunications and Energy on its own motion regarding the service quality guidelines established in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 99-84 (2001)	))))))	D.T.E. 04-116

COMMENTS OF MASSACHUSETTS ELECTRIC COMPANY AND NANTUCKET ELECTRIC COMPANY

I. Introduction and Executive Summary

Massachusetts Electric Company and Nantucket Electric Company (together, "Mass. Electric" or "Company") appreciate the opportunity to provide comments to the Department of Telecommunications and Energy ("Department") regarding its investigation into the service quality ("SQ") guidelines established in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 99-84 (2001)[1] (DTE 04-116).

Mass. Electric's comments address the Department's specific questions posed in this docket, and the Company also recommends certain further enhancements relative to the existing SQ plan. In summary, Mass. Electric's main conclusions are:

1. The purpose of a service quality plan is to enable the assessment of a utility's service performance over time to "prevent deterioration of the service quality [customers] are entitled to receive."[2] The Company believes the standards and measures established by the Department in D.T.E. 99-84 have been effective in achieving this purpose.

[1] Mass. Electric's service quality plan was subsequently approved by the Department in DTE 01-71B.
[2] Excerpt from Section IV.C. of August 2000 Department order in DTE 99-84.

2. SQ plans are most effective when the resulting performance measures are based on controllable outputs and relate to customers' service expectations. Input-related measures, or measures based on outputs that vary due to factors that are uncontrollable by the utility, are generally inappropriate elements of an SQ program. Likewise, measures unrelated to customers' service expectations are inappropriate for an SQ plan. Any changes to the current standards should reflect these principles.

3. Some of the matters identified in the Department's notice of investigation (e.g., line losses, property damage, staffing levels, double poles) are not appropriate measures for inclusion in a utility's SQ plan.

4. The adoption of the Institute of Electrical and Electronics Engineers ("IEEE") Standard 1366-2003, *Guide for Electric Power Distribution Reliability Indices* ("IEEE Std. 1366-2003") would enhance the existing SQ plans by segmenting out for separate evaluation the Company's day-to-day reliability performance from performance during events that exceed the Company's established operational capability. In addition, adoption and application of IEEE Std. 1366-2003 would provide for more consistent reliability definitions among Massachusetts utilities.

Mass. Electric's comments relative to the Department's specific questions posed in this docket are as follows:

II. Specific Topics for Investigation

1) Offsets

Currently, if an LDC incurs a potential penalty for substandard performance in a penalty provision measure, the Guidelines allow that LDC to offset that penalty if the LDC exceeded its benchmark in other penalty provisions. Please discuss whether the offset provision offers an incentive for an LDC to improve SQ and whether the use of penalty offsets should be continued in the future Guidelines.

There are two primary reasons penalty offsets should be continued in future SQ guidelines. First, the primary purpose of an SQ plan is to ensure against degradation of a utility's service to its customers. However, from a statistical perspective, even assuming a constant average quality of service, and a random distribution of the measure, a utility's performance will "normally" be more than one standard deviation worse than average sixteen percent of the time and one standard deviation better than average sixteen percent of the time due simply to factors unrelated to the utility's efforts to control the performance. For example, certain performance measures such as billing adjustments and customer complaints may be adversely affected by such external factors as weather variations from year to year and changes in the economy. As such, the Department incorporated the use of penalty offsets in the current SQ guidelines under D.T.E. 99-84, at 28, so as to "provide additional safeguard against the probability of a company being subject to a service quality penalty for random variations in performance." Because there is no change in the underlying statistical nature of the data, which could result in penalties due to factors beyond the Company's control, the rationale for penalty offsets remains valid and should be maintained.

Second, the availability of penalty offsets under the current SQ plan provides an incentive for the Company to strive to exceed performance benchmarks, not just to meet them. The opportunity to earn penalty offsets promotes long-term cost-effective SQ improvements that may not otherwise be practical under a rate plan in which the Company has frozen or indexed rates. For example, a new technology could be developed which would significantly improve a performance metric to the benefit of customers, but at an additional cost to the Company. The ability for the Company to earn penalty offsets may offer sufficient economic value to support the Company's up-front cost associated with the investment. Therefore, maintaining the opportunity to earn and apply penalty offsets provides both the proper signal and the potential resources to support continuous service improvement.

Because penalties may be avoided by doing business as usual, a penalty-only system (with no offset opportunity) would be less effective in terms of promoting investments to improve service for customers. Allowing the application of a penalty offset earned in one performance measure to offset a penalty accrued in another performance measure also fosters a great sense of "teamwork" within the Company, as exceptional performance in one function or department may help to mitigate below average performance in another area.

Therefore, for these reasons, the use of penalty offsets or, preferably, incentives, as discussed in the response to Department question 5) below, should be included under the Department's SQ guidelines.

2) Odor Calls

Currently, the benchmark for odor calls is 95 percent, which is an obtainable goal of all gas LDCs. Please discuss whether this benchmark should be strengthened in the future Guidelines and SQ plans and whether multiple calls regarding a single gas leak should be considered as a single odor call response.

Mass. Electric has no comment relative to odor calls as this item does not apply to the Company.

3) Staffing Levels

G.L. c. 164, § 1E (a) requires the Department to establish benchmarks for staff and employee levels of LDCs, and G.L. c. 164, § 1E (b) requires that no company may reduce its staffing levels below what they were on November 1, 1997. However, the statute does not define what staffing levels are, e.g., whether they apply only to union employees or to all employees; whether staffing levels should include employees of non-regulated subsidiaries of the LDCs; and whether the lapse in time (between enactment of the statute and adoption of a performance-based rate plan) negates the November 1, 1997 requirement. Further, the statute does not provide for any penalty for the LDCs that do reduce their staffing levels below 1997 numbers. Please discuss the role of staffing levels in the future Guidelines.

As noted above, the purpose of an SQ plan is to enable the assessment of a utility's service performance over time, and the most effective SQ measures are based on controllable outputs regarding how well the service is delivered and relate to customers' service expectations. Input-related measures are not appropriate, for in the management of the business and provision of service to customers, an LDC makes informed business decisions about how to best use all of its resources, including its staff, to produce optimum results for customers. Including a specific staffing level benchmark as part of an SQ plan, or any other input, with attendant penalties would inappropriately suggest that there is a positive correlation between the number of employees at an LDC and the performance of the LDC relative to the established SQ standards.

While employees are a key element of providing quality service to customers, changes in the size and complement of any company's workforce are a necessity. For the Company, which has seen its staffing levels decline below 1997 levels while still maintaining compliance with *G.L. c. 164, § 1E (b)*[3], this is true for a number of reasons. First, technology has enabled the execution of work with fewer employees than the number working in 1997. Such things as the investment in automated meter reading ("AMR"), enhanced work planning and scheduling tools, and improved interconnection between internal information systems have increased employee productivity by making tasks simpler and less time consuming to perform, or by eliminating the need for certain tasks to be performed altogether. Second, the continuous search for improved efficiency and work flow has produced constant improvement and has enabled work to be performed with fewer people. Finally, the emergence and growth in the availability of third party vendors and contractors to cost effectively assume roles previously borne by Company

[3] Since the passage of the Electricity Restructuring Act of 1997, the Company's agreements with its labor unions include a provision under which the unions acknowledge that the agreement satisfies the provisions of *G.L. c. 164, § 1E (b).*

employees has also provided the Company with the opportunity to improve the efficiency of its operations, whereby benefiting customers.

This is true not just for the Company, but across the board. Economic and technological changes in recent years have had profound effects on how business is done in the US and worldwide. Business and worker productivity has been ever-increasing in virtually all sectors of the economy. According to data published by the US Department of Labor, Bureau of Labor Statistics, since 1997, the benchmark year under *G.L. c. 164, § 1E (b)*, output per hour in the US business sector has increased between 2.5 and 4.5 percent per year. Output per person has also increased in a similar fashion. In a November 2003 speech, Federal Reserve Chairman Alan Greenspan echoed what he described as this "startlingly high rise in productivity" when he highlighted the fact that output per hour in the nonfarm business sector has increased at an annual rate of 5 percent since the fourth quarter of 2001, with increases as high as 7.5 percent during the latter quarters of 2003[4].

In addition to growth in productivity, mergers and consolidations often reduce redundancies and produce synergies that enable companies to deliver the same or greater levels of service with fewer combined resources. With restructuring, the Company has divested its generation business and undergone two corporate mergers. Through it all, the Company has been able to achieve workforce reductions largely through normal attrition, voluntary retirement offers, and voluntary severance programs, while still maintaining high levels of SQ.

G. L. c. 164, § 1E(b), in its discussion of performance based rate filings, refers to staffing levels solely in the context of collective bargaining or other organizational representation, and not in the context of non-union employees. It would be inappropriate for the Department to read

[4] Remarks by Federal Reserve Chairman Alan Greenspan at the Securities Industry Association annual meeting, Boca Raton, Florida, November 6, 2003

this more broadly and set staffing levels for non-union employees. This is a management function that should be left to the LDC.

4) Standardization of SQ Performance Benchmarks

In D.T.E. 99-84, at 3-4, the Department required that LDCs collect any data that may be necessary for the Department to revisit, in the future, the issue of using benchmarks based on nationwide, regionwide, or statewide data. The LDCs sent the Department a report on December 19, 2002 concluding that using the historical performance of each LDC on the respective performance measures remains the best method for establishing performance benchmarks. Summary of Findings Related to Service Quality Benchmarking Efforts, Navigant Consulting, Inc. (December 19, 2002). Please comment.

In the *Summary of Findings Related to Service Quality Benchmarking Efforts, Navigant Consulting, Inc. (December 19, 2002)*, Navigant, on behalf of Massachusetts utilities, concluded that benchmarking on a statewide, regionwide or nationwide basis was impractical due to a number of factors. Specifically, Navigant pointed to "the inherent differences in service quality definitions, geography, system design and construction" (Navigant at 23), as well as issues relative to data collection and reporting systems and the overall lack of published and available data sources upon which to compare Massachusetts utilities, as reasons why assessing penalties based on benchmarked data was problematic and could not be done.

While strides have been made in terms of the sophistication and accuracy of data collection, issues relative to utilities' differing geographies, customer densities and demographics, system design and construction methods, and use of legacy systems still exist. Because of this, establishing performance benchmarks for each LDC based on its own historical performance remains preferable.

In addition, establishing benchmarks for all companies presumably would require benchmarks that are geared toward the average of all utilities. Using averages as benchmarks would disincent utilities which have historically performed better than the average, and unfairly penalize utilities which have historically performed below the average, particularly if such utilities have fixed rates with no mechanism to recover the costs which would have to be incurred to achieve better service. Furthermore, consideration must be given to customer expectation and preference, as customers of various utilities do not and may not expect to receive the same level of service, and may not be willing to pay for improved service. If customers are satisfied with their current SQ, assigning the same arbitrary benchmarked values to all utilities in the state is unnecessary. Thus, the Company believes that benchmarks for individual SQ measures should continue to be established based on a company's own historical data to ensure that the primary purpose of an SQ plan - that customers are not experiencing degradation in service as compared to the service levels to which they are accustomed - is met.

Although the Company believes that benchmarking cannot yet be done, the Department has already made significant strides in facilitating comparability of results among Massachusetts utilities. By establishing consistent definitions under the existing SQ plan for many of the SQ standards, including lost-time accidents, call answering and meters read, the Department is better able to compare utilities' performance on a statewide basis. Other customer service measures such as billing adjustments and customer complaints may be less easy to compare even on a statewide basis since they are somewhat more subjective and may be influenced more dramatically by external utility-specific factors including the demographics of a company's customer base.

In the area of reliability, benchmarking is particularly difficult. To that end, the IEEE, or the Institute of Electrical and Electronics Engineers, Inc., the national standards-making body, has done a significant amount of work. The IEEE Working Group on System Design recently completed IEEE Std. 1366-2003, a guide for electric power distribution reliability indices, the adoption of which may facilitate better comparison of utilities' reliability results on a statewide, regionwide, and even nationwide basis. The IEEE Working Group reviewed SQ plans across the nation and found there to be a wide variation in collected information that led to great variability in reported reliability performance across the nation. The Working Group found two key issues that affect the ability to compare reliability performance across utilities: 1) the absence of common definitions and 2) differing data collection procedures/processes. As a result, IEEE Std. 1366-2003 sets forth consistent definitions for reliability indices and terms that affect the calculation of reliability indices.

In addition, IEEE Std. 1366-2003 also includes the 2.5β Methodology which segments reliability data into two different operational performance groups. These performance groups are 1) day-to-day performance which reflects the operating conditions the utility should have designed, built and operated the system to withstand and staffed to handle and 2) major event/crisis performance which reflects periods of abnormal system performance due to events that exceed the utility's established operational capability. Segmenting reliability data in this fashion and using true day-to-day performance to establish reliability performance measures, as well as employing consistent definitions as discussed above, greatly facilitates consistency and comparability among utilities.

While IEEE Std. 1366-2003 addresses the need for common definitions, it does not define a common data collection procedure. Today, utilities have differing outage management tracking software with accompanying data collection processes, or alternatively, have manual data collection systems, or paper systems. How a utility collects data directly impacts the accuracy of the information. More accurate collection of information through automated systems generally results in increased indices or a perceived worsening of performance. Thus, comparing the performance of utilities that have paper-based systems with those that have fully connected models with mature outage management processes would be inappropriate. The indices collected using these two approaches could vary by as much as seventy-five percent even if they were collected for the exact same utility. The differences in the Company's own historical reliability performance data due to the implementation of an automated system of data collection from a paper-based approach are fully discussed in Attachment 1 to this document.

As a result of these data collection issues, the Company advocates maintaining the establishment of reliability performance benchmarks based on a company's own historical performance. However, the Company also recommends that the Department have all Massachusetts utilities adopt IEEE Std. 1366-2003 to allow for greater consistency of definitions and more effective evaluation of performance data via the segmentation of true day-to-day operational performance from crisis performance. Doing so would provide for more consistent reporting of reliability results, enable a truer assessment of a utility's year-to-year performance under typical operating conditions, and be a step towards making comparison of reliability performance among utilities on a statewide basis more practical. In addition, since being fully accepted in 2004, a number of states have either adopted or are considering adoption of IEEE Std. 1366-2003, which would also increase the potential for regionwide and/or nationwide benchmarking in the future.

5) SQ Incentives

Please comment as to whether any LDC should be allowed to collect incentives for SQ performance. MECo and Nantucket Electric Company (collectively "MECo"), are allowed to collect incentives back from ratepayers if it exceeds its benchmarks in the penalty provisions. The Department approved incentives as part of MECo's SQ plan because MECo's prior SQ plan, pursuant to <u>Massachusetts Electric Company/Eastern Edison Company</u>, D.T.E. 99-47, at 13, 31-32 (2000), contained penalty/reward structures, and in consideration of the potential benefits to ratepayers. D.T.E. 01-71B at 24 (2001).

The Company believes that allowing utilities to collect incentives earned under SQ plans would be beneficial to customers and in the public interest. The benefits mirror those that accrue from offsets, discussed in the response to Department question 1) above, but they are greatly enhanced.

Incentives provide a positive signal to continuously improve SQ performance in a way that penalty-only plans do not. Incentives also provide additional resources that can support improvements in SQ that may not otherwise be available under a long-term performance-based rate plan that has fixed revenues, such as that of the Company. For example, a new technology may be developed that improves a performance metric significantly, but at an additional cost. Under an economic analysis of the new program, the additional revenues resulting from a positive incentive would be available to support the up-front costs associated with the improvement. However, under an offset plan or a penalty-only plan, the economic incentive to make the up-front technology investment would be diminished and/or lost.

For Mass. Electric, which has had the ability to earn incentives under its current SQ plan, tangible examples of implementation of this kind of improvement exist. The Company's investment in the AMR program substantially improved the accuracy of its meter readings and flexibility of its system. It has earned positive incentive payments that, along with other operational and maintenance savings, helped support the up-front costs of the new program. In addition, the Company has implemented numerous enhancements and new technologies in the area of call answering, so as to facilitate customers' increasing demand for self-service and to better match the availability of resources with customer call volume. Finally, the Company has also redeployed resources to proactively address customer complaints and billing adjustments in a successful manner. These measures, which have helped to earn incentives for the Company, clearly illustrate that positive incentives provide both the signal and the resources to support continuous service improvement. Because penalties can be avoided simply by doing business as usual, a penalty-only system will not be nearly as effective in promoting investments aimed at improving service for the benefit of customers.

While customers reap the benefits of a utilities' continuous improvement, customers remain protected from inappropriate incentives through the Department's review of the utilities' SQ performance and its ability to recalibrate performance targets. For example, if a utility annually earns incentives in certain performance standards, the Department can review whether the positive performance signals a broad industry trend or is the result of a singular effort by the utility. If the industry is improving in one particular service area, the Department may find it appropriate to prospectively recalibrate the performance standard measurement. Conversely, if the continued good performance is the result of particular attention or effort by one company, the Department could allow the utility to maintain the measurements of SQ as a signal to other utilities that producing exceptional consumer value would be rewarded through incentive mechanisms. Thus, continued performance improvement by utilities is fostered through rewards for that improvement.

6) Customer Service Guarantees

> *LDCs are currently required to pay $25.00 to any customer if they fail to meet a scheduled service appointment or fail to notify a customer of a scheduled outage. D.T.E. 99-84, at 38. Please discuss whether the future Guidelines should require (a) payment to customers whether or not the customer requests the credit and (b) classification as a missed service appointment if the LDC contacts the customer within four hours of the missed appointment and re-schedules the appointment.*

With regard to missed scheduled service appointments, Mass. Electric currently issues a credit to customers if it determines the Company missed a scheduled service appointment, whether or not the customer requests the credit.

For planned, non-emergency, outages, Mass. Electric puts forth significant effort to inform its customers of such outages in advance. The Company utilizes its Outage Management System, cross referenced with its Customer Information System, to determine which customers will be affected by a planned outage. These systems integrate to assign each customer to a particular "feeder" and "branch". For outages of more than a single transformer, the Company queries the database to determine affected customers and mails an outage notification to each customer describing the outage date, as well as an alternate date in case of inclement weather. These notifications are mailed to customers so as to provide them with at least seven days advance notification. To the extent an outage is necessary for a single transformer, existing systems are unable to support this same notification process. Instead, the Company's field workers make every effort to identify those customers served by the transformer and to then notify the customers of the outage by going door to door just prior to de-energizing the transformer.

Since the Company is using its most up to date records to notify customers of pending outages, the Company expects that all customers are being notified. Should a customer notification be missed due to a potential error in Company records, the Company will only be made aware if a customer calls to notify the Company of a missed notification. Therefore, for missed notifications of planned non-emergency outages, the Company recommends that payment be made to customers only when the customer requests the credit.

Because there are situations that arise from time to time that might prevent the Company from meeting a scheduled appointment (e.g. due to a severe storm), Mass. Electric believes that it would be reasonable and appropriate if the LDC notified the customer within four hours of the scheduled appointment time and rescheduled the appointment without penalty.

7) Property Damage

The Department established a reporting requirement regarding losses related to damage of company-owned property as it was likely to contribute to assessing company safety performance. D.T.E. 99-84, at 17. Please discuss whether this reporting requirement should be made a penalty measure in the future Guidelines.

As previously stated, SQ plans are intended to measure whether a utility's customers have experienced degradation in service. Reporting data relative to damage to an electric distribution company's property, either in terms of the number of the events or the dollar value of those events, has little relevance to the quality of service expected or experienced by a customer. While the data can be objectively quantified and measured, changes from year to year with respect to those results may be related to factors other than a utility's service performance. In addition, to the extent damage to a utility's property is caused by a third party, and is outside the utility's control, assessing penalties on such a measure under an SQ plan would be inappropriate. For these reasons, the Company recommends not incorporating losses related to damage of company-owned property as a penalty measure in future SQ guidelines.

8) Line Loss

In D.T.E. 99-84, at 18, the Department acknowledged that an electric distribution company may experience percentage variations in line losses from year to year unrelated to SQ degradation. Please discuss whether line losses should be made a reporting requirement in the future Guidelines.

As the Department notes in D.T.E. 99-84, at 18, percentage variations may occur in line losses as a result of factors outside of the control of electric distribution companies, which are therefore unrelated to a company's SQ performance. Specifically, losses are affected by the amount of load on the system, the ability of the infrastructure to supply that load, ambient environmental conditions, and, most importantly, the load factor of that load. With all else remaining the same, a thirty percent variation in losses could be registered from one year to the next, due solely to a change in the load factor of the customers, within the expected variation of load factor. This level of variation does not support the use of losses as a meaningful SQ measure. Since system losses vary as the square of the system load, the occurrence of a general recession, with the attendant lowering of electric usage, would decrease losses although the utility had no role in that reduction.

Also, not only is a customer's load factor variation beyond the control of the electricity delivering utilities, power suppliers have the greatest incentive to influence a customer's load factor in a restructured industry. This is because changes in a customer's load factor can have a significant effect on the cost of supplying power to the customer.

That said, the Company acknowledges that line losses directly impact the costs borne by customers. As such, the Company is agreeable to continuing the existing reporting requirement for line losses in future SQ guidelines for informational purposes, but does not believe an SQ measure related to line losses is appropriate.

9) Double Poles

G.L. c. 164, § 34B requires electric distribution and telephone companies engaged in the replacement of an existing pole to remove the existing pole from the site within 90 days after the date of installation of the new pole. Please discuss whether it would be appropriate to include timely removal of double poles as an SQ measure.

Mass. Electric does not believe it is appropriate to include performance on removal of double poles as an SQ measure. The purpose of an SQ plan is to ensure that a utility's customers experience no significant degradation of service. The existing SQ performance measures prescribed under D.T.E. 99-84 monitor utilities' performance on items that directly affect customer SQ. For electric companies, this includes measures such as reading meters, answering customer calls, and service reliability. Unlike these measures, the removal of double poles does not impact the quality of service a utility customer receives.

Furthermore, as previously stated, to be effective, SQ performance measures should be aligned with factors within the Company's control. As the Department states in D.T.E. 03-87, at 16, the ultimate removal of double poles is dependent not only on the utility but also on other attachees to, or owners of, the pole. Because double pole removal is often outside the direct control of the Company, the Company does not support its use as an SQ performance measure: it is not a measure of the Company's controllable performance, but rather is directly affected by the actions of several third parties, including the telephone company, municipalities, cable companies and other communications companies.

Finally, pursuant to D.T.E. 03-87, the issue of double poles is currently being addressed on a statewide basis. The Company has been working diligently to reduce its backlog of double poles and has made good progress to date. The Company is also actively managing the equipment transfers and removal with other pole attachees utilizing Inquest's Pole Lifecycle Management system. Progress with respect to double poles is reported to the Department on a semi-annual basis. The double poles issue throughout the state should be sufficiently addressed through these efforts.

Therefore, for all of the above reasons, the Company believes that measuring the removal of double poles should not be included as an SQ measure.

10) SAIDI/SAIFI

In D.T.E. 99-84, at 13, the Department accepted as penalty provisions SAIDI and SAIFI. The Department allowed electric LDCs to use their own company-specific definitions for "sustained outages or interruptions," "momentary outages," and "excludable major events," to establish benchmarks for SAIDI and SAIFI performance standards. Id. Please discuss whether it is appropriate to develop new definitions for these subjects.

SAIDI and SAIFI are appropriate measures for assessing utilities' reliability SQ performance and should continue to be used in future SQ guidelines. The Company recommends that the current definition for "excludable major events" be revisited to reflect current industry standards. In addition, interruptions to all customers, including interruptions on secondaries, services, and transformers which are currently excluded from reporting requirements under the existing SQ plan, should be included going forward. To that end, the Company recommends the adoption of IEEE Std. 1366-2003 for purposes of developing reliability performance standards under future SQ guidelines.

IEEE Std. 1366-2003

As discussed in the response to Department question 4), the IEEE Working Group on System Design recently completed IEEE Std. 1366-2003 which defines reliability indices, the terms that affect the calculation of reliability indices, and the 2.5β Methodology that segments data into different operational performance groups. This standard has been approved by both the IEEE and the American National Standards Institute, or ANSI. By prescribing consistent definitions, IEEE Std. 1366-2003 eliminates the issue of company-specific definitions and also sets forth a new methodology for determining major event days ("MEDs"), known as the 2.5β Methodology, which is statistical in nature.

In evaluating the breadth of SQ plans in the industry, the Working Group found that there was significant variation within the industry with regard to the criteria and definitions used to exclude reliability performance for reporting purposes. Nearly every "exclusion" definition was based on the percentage of customers interrupted over a period of time and did not effectively present the resultant trends of day-to-day operations, as demonstrated by the wide variability in reported indices from year to year by utilities. Thus, it was clear that a more uniform measuring stick was required and that performance had to be segregated into different components to allow for better analysis and appropriate optimization of expenditures for system improvements. The Working Group therefore determined that performance needed to be segmented into the two very different operational modes that all utilities face: day-to-day and crisis mode.

As a result of this work, the IEEE 2.5β Methodology under IEEE Std. 1366-2003 segments interruptions/events into two categories: day-to-day and MEDs. MEDs are days that exceed a pre-set SAIDI threshold, representing those few days which surpass a company's system design and/or operational limits and that are truly extraordinary in the operations of utilities. By utilizing the utility's own daily SAIDI data, this method can be applied appropriately to utilities of all sizes, locations, and system designs. Separately identifying and evaluating MEDs from days related to a company's true day-to-day operational performance brings greater clarity to reliability-related issues. Areas in need of corrective action are appropriately identified and the proper establishment of SQ performance measures is facilitated. In addition, while MEDs are excluded from the calculation of the reliability performance measures, unlike the major event exclusion criteria under the Company's current SQ plan, IEEE Std. 1366-2003 requires that all events/interruptions be reported, including MEDs, so that they too can be properly analyzed.

The MED concept is an approach that assists utilities and regulators in evaluating a utility's reliability performance by differentiating between two very different operating conditions; namely major event/crisis performance and day-to-day performance. Historically, data from these two dissimilar conditions were seldom effectively segmented, thereby masking performance for both conditions. Because MEDs represent periods of abnormal system performance that can skew day-to-day performance results, it is important that this performance be separated so as to accurately portray how a utility system actually performs on a normal day-to-day basis. Once segmented from MEDs, day-to-day performance, which represents performance within a company's control, can then be used for reliability target/goal setting. MEDs are reported on to assess whether the Company sufficiently prepared for these crisis conditions by establishing plans and processes for obtaining materials and manpower to address these unique situations. Thus, by separating MEDs from day-to-day performance, the Company and the Department will be able to more clearly assess the Company's overall day-to-day reliability performance, while also being able to evaluate MEDs to determine if the Company made sound decisions during crisis conditions. In addition, such separation enables appropriate review of both sets so as to optimize spending for system improvements.

By way of background, the Working Group made two key discoveries that led to the creation of the MED concept. First, daily SAIDI is a good indicator of major events. Because SAIDI is a function of both the number of customers affected by an interruption and the duration of that interruption, it shows when either system design and/or operational limits are exceeded. Since SAIDI is comprised of customer minutes interrupted divided by customers served, it is utility size independent. Second, reliability data is not distributed on a normal, or Gaussian, basis, which is best represented by a "bell-shaped" curve, and instead most closely resembles a lognormal distribution. Until this work was undertaken, people were largely unaware that reliability performance did not follow a bell-shaped curve. Without this understanding of the distribution of the data, it was nearly impossible to set appropriate performance target bands under an SQ plan.

To illustrate, Figure 1 below, which reflects data for the reliability metric SAIDI on a daily histogram basis, shows that the overwhelming majority of days had a SAIDI below one minute, and that there were approximately 100 days with SAIDI of approximately 0.05 minutes. Understanding that most days have a very small number of events and accrue a low amount of SAIDI helps to define the day-to-day operations. Knowing the bounds of typical reliability requirements helps utilities to effectively build, design and operate their systems.

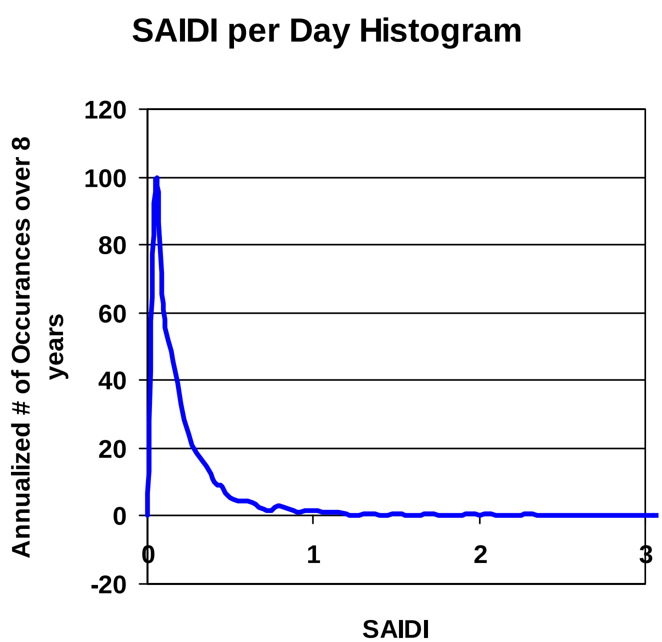

Figure 1. Lognormal Distribution of Daily SAIDI

Similarly, Figure 2 shows the same data, but the data has been transformed into lognormal space. Notice that in this figure, the data plots a bell-shaped curve.

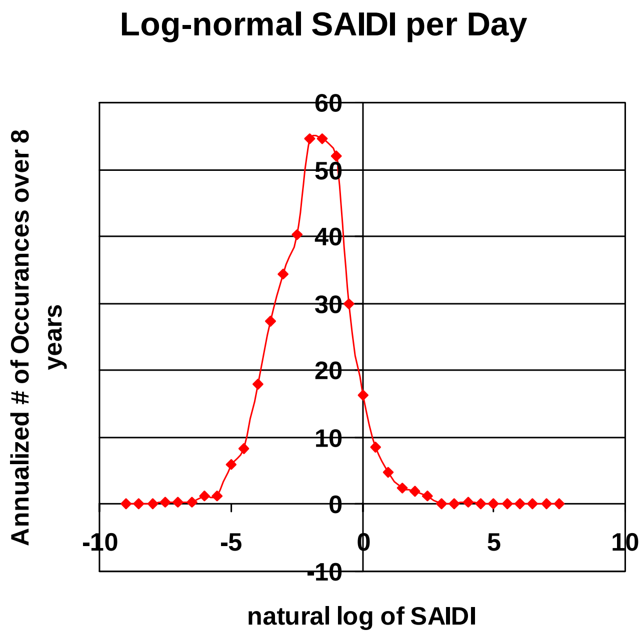

Figure 2. Daily Performance Data in Log-Space

In the lognormal space, the concepts of mean and standard deviation are applied in exactly the same way they are applied to Gaussian data. Transforming reliability data into lognormal space, calculating reliability performance target bands, and transforming values back to normal space allows mathematical tools to be correctly applied to a bell-shaped curve to determine the appropriate SQ targets of the lognormal distributed reliability data. Using this methodology, the resulting reliability SQ performance targets are aligned with other SQ targets, which are based on Gaussian data, such that the resulting triggers for minimum penalties or incentives [i.e. mean +/- one standard deviation (σ)] are statistically determined to encompass approximately 68 percent of all observations. Therefore, lognormal distribution reflects the appropriate approach for evaluating reliability performance and for establishing reliability performance targets under an SQ plan.

The MED concept, defined by the 2.5β Methodology, requires the following seven steps:

1. Collect values of daily SAIDI for five sequential years, ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all available historical data until five years of historical data are available.

2. Only those days that have a SAIDI/day value will be used to calculate the T_{MED} (defined below; do not include days that did not have any interruptions).

3. Take the natural logarithm (ln) of each daily SAIDI value in the data set.

4. Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.

5. Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.

6. Compute the MED threshold, T_{MED}, using the equation:
$$T_{MED} = e^{(\alpha + 2.5\beta)}$$

7. Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is classified as a Major Event Day.

While seemingly complex, the calculations described above can be performed by any spreadsheet program or can be embedded directly into an outage management system. Once the threshold is determined, it is used for assessment of daily SAIDI values during the current calendar year to declare and classify MEDs.

It is also possible to view the applicability of lognormal distribution to annual reliability data by plotting actual data against theoretical data. To clearly illustrate the distribution of the yearly data as lognormal, the Company offers a surrogate data set, that of all of the National Grid USA New England, consisting of SAIDI and SAIFI values existing from 1968 forward. Given the nature of system reliability, it is reasonable to assume that the distribution of the data would be similar for a part of the region measured as for the region as a whole. As such, the following charts present the lognormal test of this yearly system data for SAIDI and SAIFI:

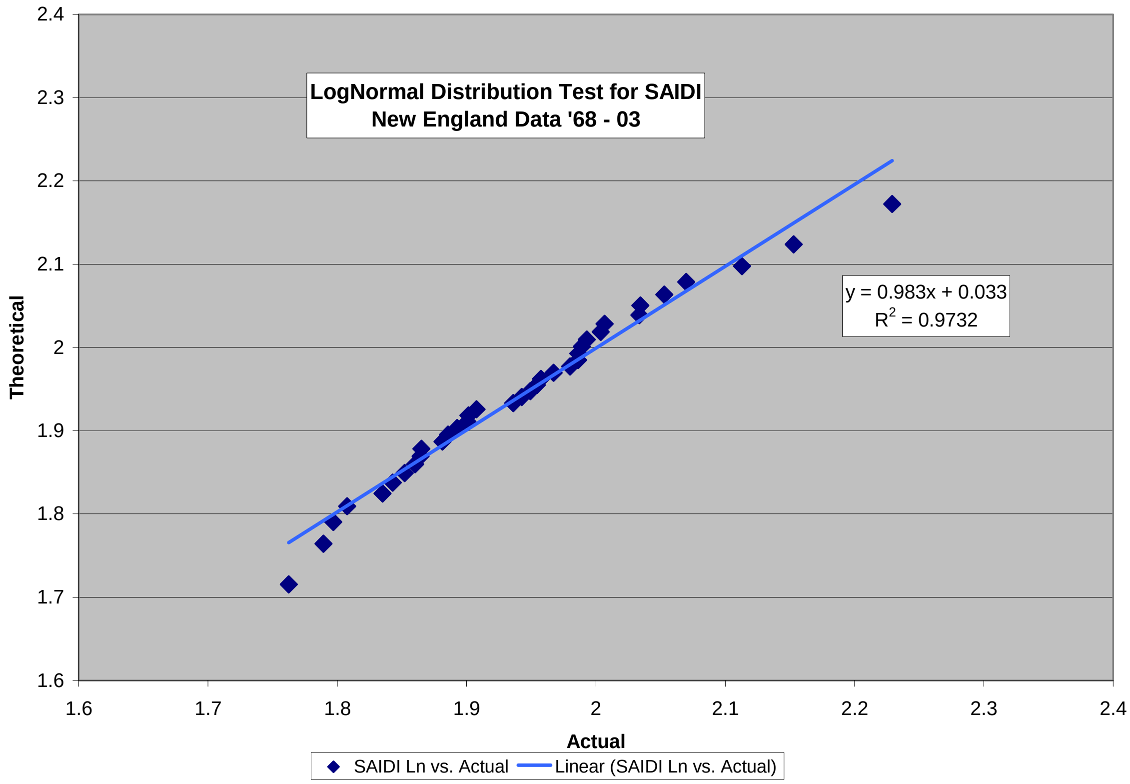

Figure 3. Lognormal Test for SAIDI (New England data)

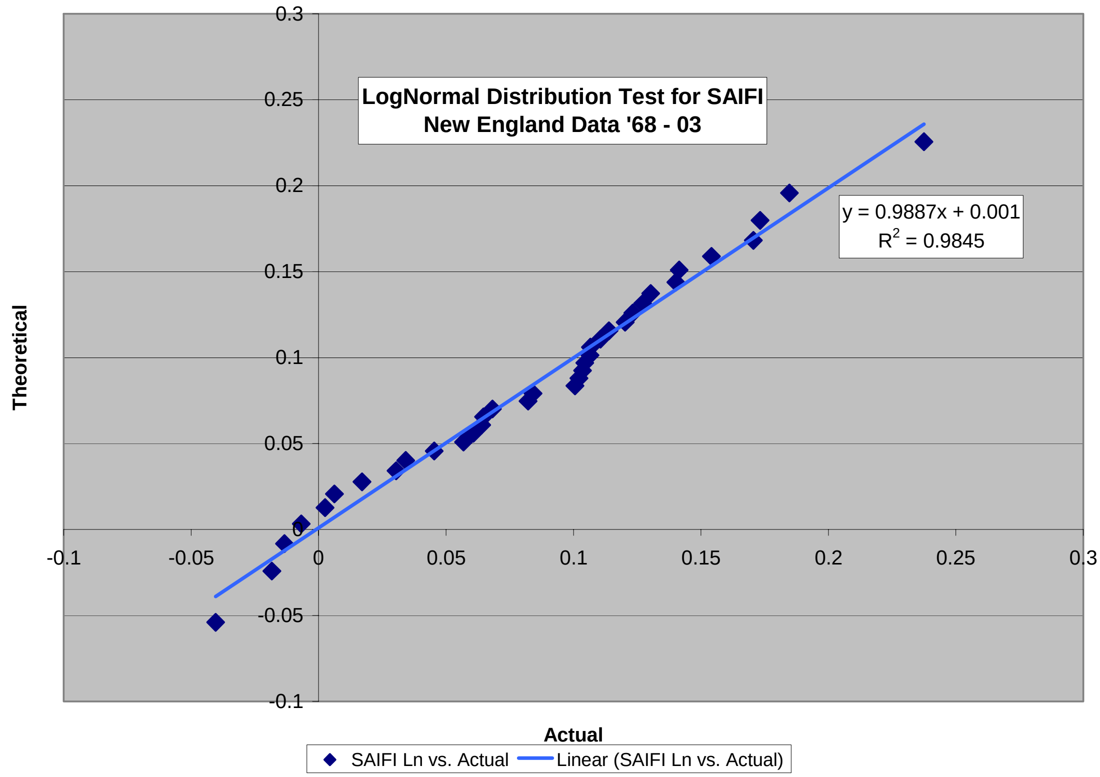

Figure 4. Lognormal Test for SAIFI (New England data)

The fact that the data in the above charts plots on a straight line indicates that the distribution of the data for both SAIDI and SAIFI demonstrates lognormal characteristics.

Summary

The Company proposes adopting the use of IEEE Std. 1366-2003 because it will provide the Company and the Department with a clearer understanding of the Company's reliability performance under both day-to-day circumstances and during major events, which will therefore aid in the establishment of appropriate reliability performance measures under future SQ guidelines. The standard will also allow for better optimization of expenditures to target programs/projects that truly enhance reliability where required. Finally, as described in the comments to Department question 4) above, IEEE Std. 1366-2003 has the potential to help move the Company toward a more common basis for regulatory reporting with other companies.

III. Conclusion

Mass. Electric appreciates the opportunity to provide comments to the Department relative to its investigation into the current SQ guidelines established in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 99-84. The Company looks forward to working with the Department to assist in establishing meaningful future guidelines that encourage/incentivise adherence to SQ performance standards for the benefit of all involved parties.

Respectfully submitted,

MASSACHUSETTS ELECTRIC COMPANY
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By their attorneys,

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Dated: March 1, 2005

Attachment 1

Impact of New Data Collection Systems on the Establishment of SQ Performance Targets

In the Company's current SQ plan, reliability performance targets were established based solely on the historical interruption data collected by the Company. During the period upon which the current performance targets are based, the Company changed how it collects interruption data. The following paragraphs describe the impact of this system change, which was made in 1999, on the resultant reliability metrics. This discussion is the result of work that is based on findings developed during the creation of IEEE Std. 1366-2003, but which is not part of IEEE Std. 1366-2003 itself, since the standard does not specifically address the impact that improvements in data collection methods can have on reliability performance measures. However, while it is beyond the actual scope of IEEE Std. 1366-2003, the impact of a change in data collection methods is pertinent to the proper establishment of reliability performance targets under an SQ plan. As such, consideration should be given to using adjusted historical data, as described below, in developing future SQ performance targets for reliability.

In the second quarter of 1999, the Company began using an automated data collection and reporting system, its Interruption Disturbance System ("IDS"), to track interruptions. This implementation moved the Company from a field worker-driven, paper-based system to one that automatically captured system interruption data. Since this new system no longer relied upon the ability of field workers to estimate the number of customers affected, nor on the proper handling, transport, storage, translation, and data input of the paper records, the accuracy of the resultant reliability metrics was increased. While it was believed that the prior process was as accurate as other paper-based systems used by other companies, a computerized system does not misplace records nor does it estimate affected customer numbers. As a result of this system change, the

Company's reported metrics appear to have increased; SAIDI by at least 19.2 percent and SAIFI by at least 8.6 percent. As mentioned in the response to Department question 4) in this docket D.T.E. 04-116, companies that have implemented similar systems have also experienced significant increases in the resultant reliability metrics.

Although one might correlate the effect of implementing a new reliability data collection system with any increase seen in the first year of use, the normal variability of reliability results for any company can mask the true value of that effect in such a short time frame. Thus, a trending analysis, or viewing the effect over a longer period of time, provides a more accurate picture of the true impact of any change introduced to an existing process. The Company used this trending approach, as described in greater detail below, so as to identify the increases in the reliability metrics mentioned above.

To identify the trending of the reliability metrics, incremented averaging was used. Using this approach, a set of values was created for each year evaluated, each value in a set being the average of all values from the start year to the year being incremented to that set. An example is presented below:

MECO - SAIDI Incremented Averages

Increment Year ↓ / Start Year →	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1993	79.810											
1994	75.745	71.680										
1995	73.993	71.085	70.490									
1996	76.080	74.837	76.415	82.340								
1997	74.530	73.210	73.720	75.335	68.330							
1998	74.318	73.220	73.605	74.643	70.795	73.260						
1999	75.006	74.205	74.710	75.765	73.573	76.195	79.130					
2000	75.918	75.361	75.975	77.072	75.755	78.230	80.715	82.300				
2001	78.119	77.908	78.797	80.182	79.750	82.605	85.720	89.015	95.730			
2002	82.051	82.300	83.628	85.504	86.032	89.572	93.650	98.490	106.585	117.440		
2003	83.690	84.078	85.456	87.326	88.039	91.323	94.936	98.888	104.417	108.760	100.080	
2004	86.906	87.551	89.138	91.210	92.319	95.746	99.493	103.566	108.883	113.267	111.180	122.280

In the above table, the actual SAIDI for each year is the first value found in the "Start Year" column. The actual SAIDI shown for each year has been calculated consistent with IEEE Std. 1366-2003. The next value in the column is the average of that year and the SAIDI value for the next year. The third value in the column is the average of the Start Year SAIDI and the SAIDI for the next two years. This is continued until all years from the start year have been included.

Under this method, the trend for the metric and any significant change in the character of the data can be demonstrated when lines are drawn for the values in each of the individual Start Year columns. This can be most easily seen in graphical form, as follows:

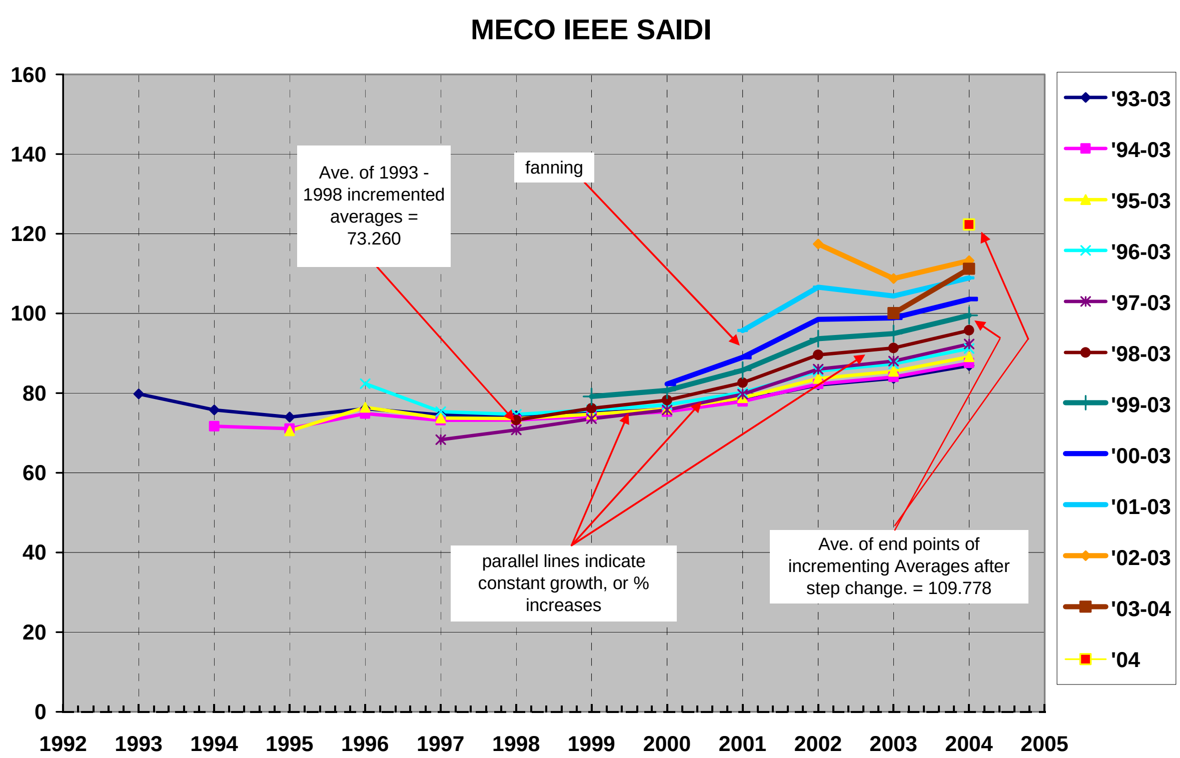

Figure 1. MECO SAIDI Incremented Averages

The change in the trending of the incremented averages between 1998 and 1999 suggests a basic change in the data set. Aberrations that normally occur, such as the seemingly very low value in 1997, will cause temporary fluctuations in the incremented averaging trends, as can be seen in the Start Year 1996 line. However, as can be also seen, the 1997 value has no long-term effect on the inherent average value of the prior years' trends. The shifting of the trend lines from 1999 onward is not caused by temporary aberrations in the data, but rather, by the effect of introducing the new data collection system, IDS. The effect of the IDS implementation on the long-term average of the SAIDI reliability metric can be determined by comparing the trend up to 1998 to the trend after 1998. The trends after 1998 indicate two separate conditions occurring, a step increase starting in 1999 and a constant growth in the metric after 1998. The spreading out of the trend lines post-1999, identified as "fanning" on the chart, indicates a step increase in the average of the data. The paralleling of the trend lines indicates a constant growth rate occurring.

Through the application of an analysis model, it was determined that a 19.2 percent step increase in the average yearly SAIDI value occurred after the implementation of IDS, and a 5.5 percent yearly increase in SAIDI has occurred since 1999. While the reason for the 5.5 percent yearly increase has yet to be determined, possible causes are: 1) a change in weather patterns throughout the Northeast, since a similar effect has also been observed in other nearby utilities' reliability data, 2) the actual deterioration of system reliability, or 3) the effect of more accurate use of the IDS during a reasonable breaking-in period. The apparent non-continuation of this trend for 2003 and 2004 would tend to implicate the integration of the new IDS over a normal, new-system-acceptance period.

The validity of the 19.2 percent step increase and the 5.5 percent constant growth can be determined by reducing the values of the reliability metric from 1999 to 2004 by the 19.2 percent step increase and the 5.5 percent growth and then redoing the previous chart. This "normalizes" the data post-1998 to reflect the assumed changes. If the normalization is correct, all incremented averages will trend towards the same value, the same average noted in year 1998, or pre-IDS. The result of this normalization is shown in the chart below:

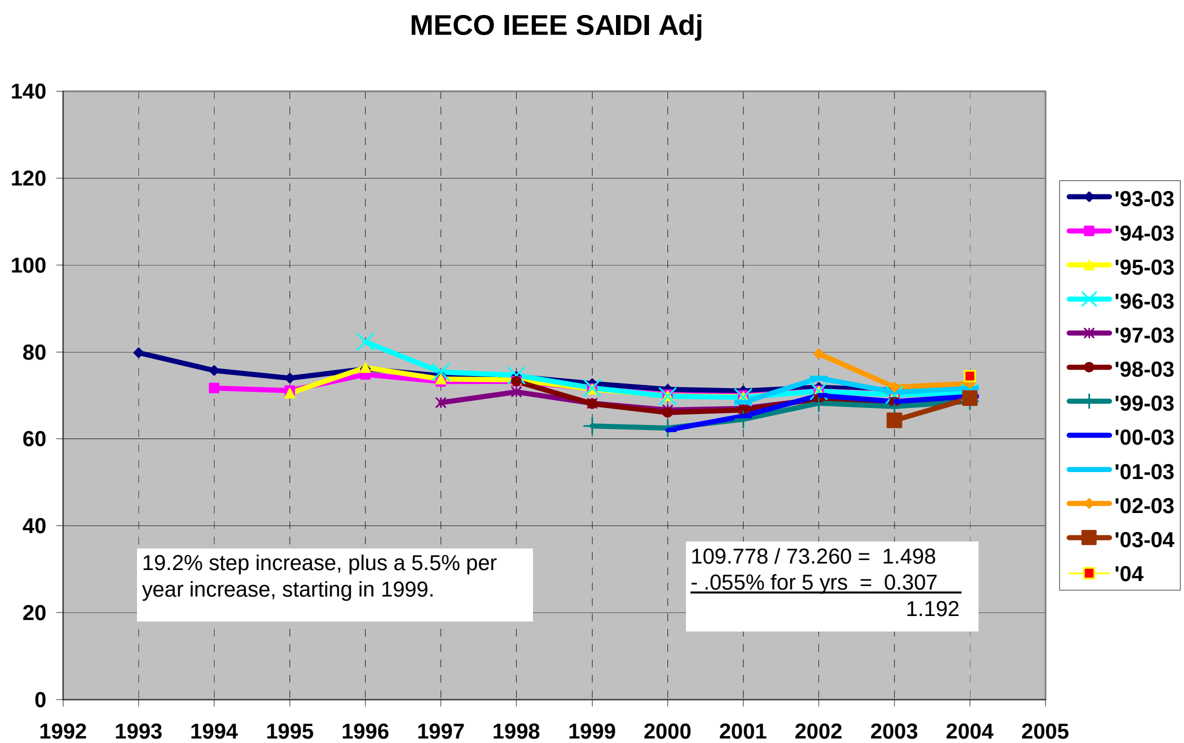

Figure 2. MECO SAIDI Adjusted

The 19.2 percent step change, reflecting the effect of the introducing IDS, and the 5.5 percent constant growth adjustments have brought the incremented averages of the Start Years post-1998 to the same level as the values pre-1999. This result indicates that the correct values were determined for the step increase and constant growth rate. Other values would have caused the post-1998 incremented averages to either show remnants of constant growth, shown by parallel lines, or the fanning of the incremented averages, or the trending of the incremented averages to a point other than the average of the lines as of 1998.

The effect of implementing IDS on the SAIFI reliability metric can be discerned in the same manner, as shown in the chart below:

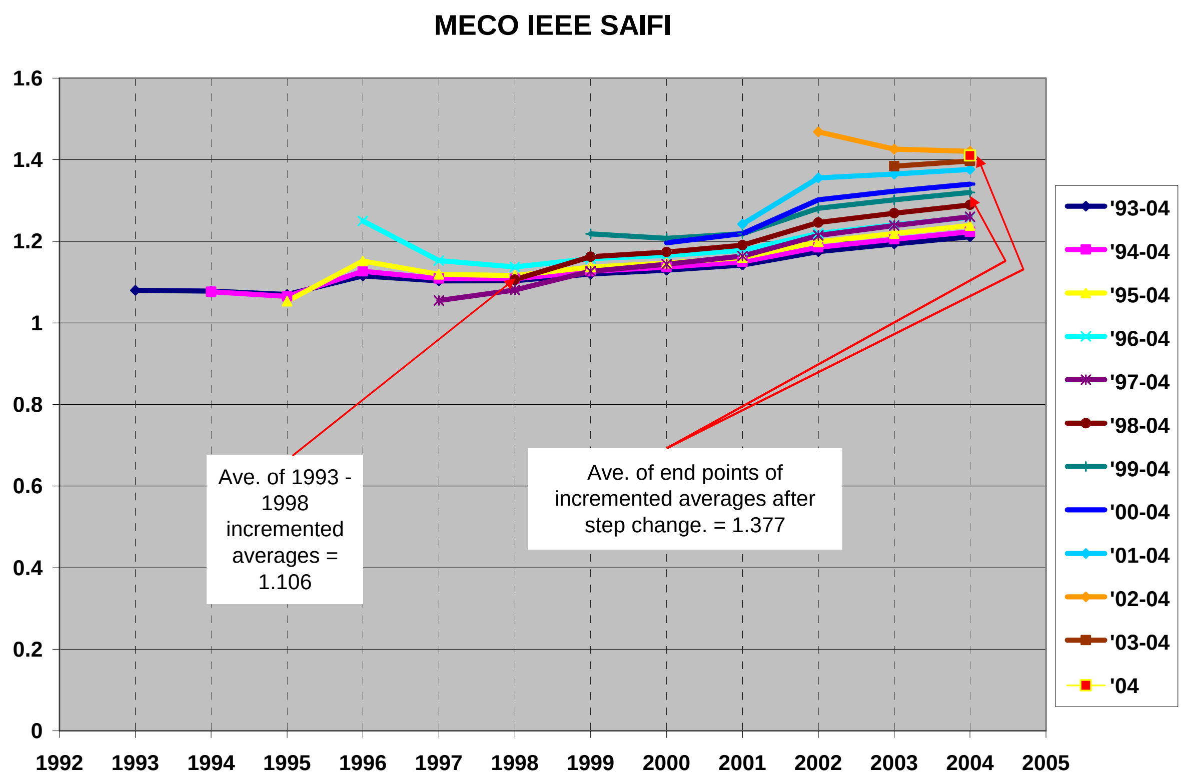

Figure 3. MECO SAIFI Incrementing Averages

Figure 3 clearly depicts the effect of the 1999 change in the method of collecting the reliability event records on the SAIFI reliability metric. The effect of the IDS implementation on the long-term average of SAIFI can be determined by comparing the trend up to 1998 to the trend after 1998. As previously described in the discussion of the SAIDI metric, the trends after

1998 indicate that two separate conditions are occurring, a step increase starting in 1999 and a constant growth in the metric after 1998.

Through the application of an analysis model, it was determined that an 8.6 percent step increase in the average yearly SAIFI value occurred after implementation of IDS, and a 3.0 percent yearly increase in SAIFI has occurred since 1999. The same possible reasons for a constant growth in SAIDI can be applied to the 3.0 percent yearly increase in SAIFI, post-1998. Again, the apparent non-continuation of this trend for 2003 and 2004 would tend to implicate the integration of the new IDS over a normal, new-system-acceptance period.

The validity of the 8.6 percent step increase and the 3.0 percent constant growth can be determined, as was done above for SAIDI, by reducing the values of the reliability metric from 1999 to 2004 by the 8.6 percent step increase and the 3.0 percent growth increase and then redoing the previous chart. This "normalizes" the data post-1998 to reflect the assumed changes. If the normalization is correct, all incremented averages will trend towards the same value, the same average noted in year 1998, or pre-IDS. The result of this normalization is shown in the chart below:

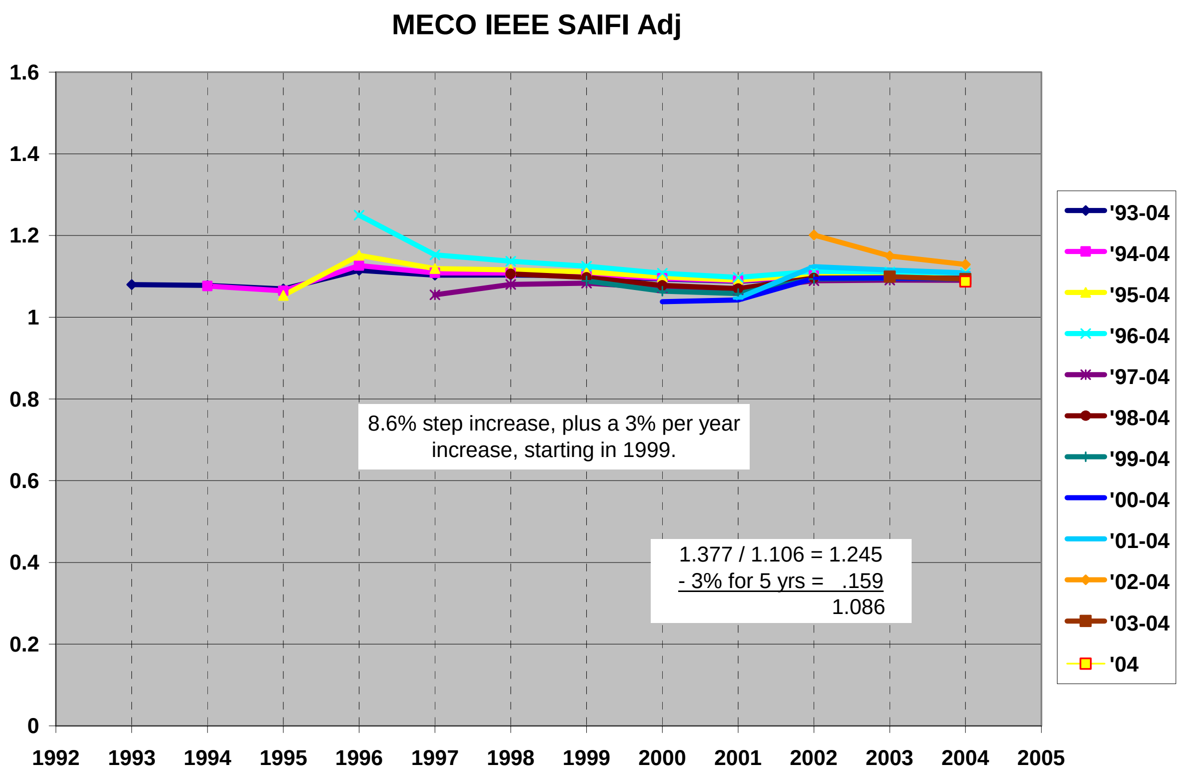

Figure 4. MECO SAIFI Adjusted

The 8.6 percent step change, reflecting the effect of introducing IDS, and the 3.0 percent constant growth adjustments have brought the incremented averages of the Start Years post-1998 to the same level as the values pre-1999. This result indicates that the correct values were determined for the step increase and constant growth rate. Other values would have caused the post-1998 incremented averages to either show remnants of constant growth, shown by parallel lines, or the fanning of the incremented averages, or the trending of the incremented averages to a point other than the average of the lines as of 1998.

Utilizing the results of this analysis to establish the reliability performance benchmarks under future SQ guidelines will ensure that the performance benchmarks are appropriately established based on the real performance of the Company and are not distorted by the introduction of a new data collection system. Setting benchmarks using adjusted data will also enable the Company to optimize its reliability-related decision making and spending so as to target programs/projects that truly enhance reliability where required. Each Company would have the burden of proof in advocating and supporting any such use of adjusted data to establish SQ benchmarks.